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MOTIVATING SUSTAINABILITY THROUGH GAMIFICATION:

Expert Opinions on Inspiring Pro-Environmental Actions

Faculty of Information Technology and Communication Sciences
Master's thesis
September 2019

ABSTRACT

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Internet and Game Studies
September 2019

The purpose of this master's thesis is to examine whether gamification could motivate and amplify pro-environmental actions on an individual level. The study was conducted with focus interviews with experts in relevant fields of gamification and sustainability, and employees in relevant positions. The studied phenomenon was researched through the use of a gamified concept of a carbon footprint calculator. The Sitoumus2050 service and the Lifestyle test included in the service were chosen as a reference case for the study. To activate and clarify the interviewees' understanding of gamification, a concept version of a gamified Sitoumus2050 service was designed and created as a tool to aid with the interviews.

The gathered data was analysed thematically. The results indicate that implementing gamification on a carbon footprint calculator service would plausibly, through users' increased willingness to use and return to the service, inspire users to increase the amount of pro-environmental actions in their everyday life.

Keywords: gamification, sustainability, motivation, pro-environmental, sitoumus2050, carbon footprint calculator

Table of Contents

1 INTRODUCTION

Environmental issues are a widely discussed topic (Chambers, Simmons, & Wackernagel, 2014; Hansmann, Mieg, & Frischknecht, 2012; Ikerd, 2012). Per recent reports on global warming (Intergovernmental Panel on Climate Change, 2018), it is fundamental for sustainability issues and how to combat them to become common knowledge. The report of Intergovernmental Panel on Climate Change (2018) brings grim news on the importance of having the global warming stop at 1,5° Celsius. The imminent global warming that affects the survivability of the human race, has resulted in actions on multiple levels: international, national, industrial and individual. Large organisations and individuals have both took up the torch to combat climate change the best they can. To better fight global warming, all fields of study should contribute to the cause.

Here is where gamification, a way to apply game elements to arouse enjoyment and gameful experiences and creation of value to services (see Deterding, Dixon, Khaled, & Nacke, 2011; Huotari & Hamari, 2012), steps in. The interest in gamification has risen in recent years. The research, and the utilitarian products based on gamification have increased in numbers (Hamari, Koivisto, & Sarsa, 2014; Makower, 2012). However, the research and actions on gamification's and sustainability's joint venture are far and in between. Some studies exist (Albertarelli et al., 2018; Berger & Schrader, 2015; Froehlich, 2015; Goodall, 2007; Negruşa et al., 2015; Nordby, Øygardslia, Sverdrup, U., Sverdrup, H., 2016) but as of now, they are few. Gamification, having the potential to introduce new habits and strengthen existing ones (see Burke, 2014; Kapp, 2012), can be a critical tool in teaching an individual new ways to live life more environmentally. As a major role in the environmental crisis rests on the shoulders of each of us (Hertwich & Peters, 2009), gamification might be a solution we need to inspire pro-environmental actions even among those not initially keen on either of the subjects – environment or gamification. Through this, a research problem was found.

Can gamification inspire pro-environmental and sustainable actions?

The present thesis observes gamification on the field of sustainability through carbon footprint calculators. Carbon footprint calculators define in kilograms of carbon dioxide (CO_2), through set of questions, the environmental impact of the unit in question, most often an individual. Gamification as a phenomenon is contemporary, even novel, making it interesting for people. Through gamification, would it be possible to make these carbon

footprint calculators more desirable, attracting users amongst them? This resulted in the first research question.

Research question 1: *In what manner, if any, would the gamification of carbon footprint calculators affect users' willingness to use them?*

As the use of the service lays grounds to any other benefits it might eventually bring, questioning the success of attracting users is critical. Through potential increase in users, we might derive that, at the very least, knowledge and consciousness about current environmental crisis spreads further. In addition to this, gamification as a motivator for concrete actions beneficial to the environment should be observed. This resulted in research question 2.

Research question 2: *Could the gamification of carbon footprint calculators motivate its users to make more sustainable choices?*

The second research question aims to clear whether the gamification of carbon footprint calculators indeed could result in users taking more sustainable courses of action in their lifestyles – to have the knowledge and the intent to actually change their habits for a moment or for longer periods of time. The aim is to find whether gamification would help heighten the motivation of users in this context. And lastly, could tracking one's CO_2 emissions through means of gamification reduce one's carbon footprint, which defines the last research question of the study.

Research question 3: *Could the increased tracking of one's carbon footprint lead to reduced CO_2 emissions for the user?*

Following the path paved by these three research questions, this thesis will lead the reader from a literature review to presentation of carbon footprint calculators, then through the methods of the study to the results and lastly to limitations of the study and suggestions of further research.

The literature review will introduce literature on gamification, sustainability, and behaviour change, to examine whether the application of gamification would inspire a more sustainable lifestyle. As sustainability as a concept is vast and ambiguous, the thesis will focus on environmental sustainability and actions inducing pro-environmental behaviour.

The service, through which the research questions are studied, is Sitoumus2050: a service dedicated to distributing information on and committing people and organisations to reducing their CO_2 emissions. Sitoumus2050 is a service owned by the Prime Minister's Office of Finland and includes a carbon footprint calculator called the Lifestyle test, which was designed and developed by the Finnish Innovation Fund Sitra.

The data for the study was gathered via expert interviews, where four experts of relevant fields were interviewed. As a tool to use in the interviews and to better communicate the concepts of gamified services, a concept of a gamified Sitoumus2050 was created. The gathered data was analysed by thematic analysis, where the themes were similar to the themes of the interviews. The thematic analysis yielded suggestions for implementing a plan for gamifying Sitoumus2050.

Mostly, the answers to the research questions were positive and the results leaned towards acceptance of the benefits of gamification. However, some concerns relating to, e.g. competition and the position of the owner of the service, arose. The concept, while not meant as a fully realised product or even a prototype of one, was met with commendations for its means of implementing progress tracking, social dimensions and sense of community in a meaningful manner.

Limitations of the study were many, mostly related to time, presence and the scope of the study. For future research suggestions, the practical next step would be to conduct a survey on the potential users to attain information on how needed or wanted a similar solution to the concept presented in the thesis in reality would be.

2 LITERATURE REVIEW

The interest towards *gamification* in both industry (Makower, 2012) and academia (Hamari et al., 2014) has grown since the first mention of gamification, spelled *gameification* (Terill, 2008) and the first proper academic definition of gamification (Deterding et al., 2011). Often referenced as "the use of game design elements in non-game contexts" (Deterding et al., 2011, p. 9), gamification is not just implementing game elements in contexts other than games. Several definitions will be examined and compared in this literature review. Gamification is oftentimes used as means to end, as a process to influence the user's behaviour in a desired way (Burke, 2014). In this way, it is related to social marketing (Mitchell, Schuster, & Drennan, 2016) and behaviour change (Werbach & Hunter, 2012). The studies on gamification overlapping with behaviour change are numerous (Kawachi, 2017; Linehan, Kirman, & Roche, 2015): therefore, I have decided to implement the behaviour changing attributes of gamification to research on the ability of inspiring pro-environmental lifestyle and reducing one's *carbon footprint* through gamification. In this instance, a pro-environmental lifestyle is determined as "behaviour that harms the environment as little as possible, or even benefits the environment" (Steg & Vlek, 2009, p. 309).

Environmental, *social* and *economic sustainability* have become widely discussed topics in the media as well as in academia (Chambers et al., 2014; Hansmann et al., 2012; Ikerd, 2012). The 2030 Agenda for Sustainable Development Goals (SDG) (United Nations, 2015) contains 17 universal goals for making the world a better place for everyone and call for the help of every sector: governments, municipalities, firms, schools, and each individual. The Paris Climate Agreement is aiming to bring all nations (member states of the UN) under a common flag to help combat climate change (United Nations, 2015). The Finnish Innovation Fund Sitra has created a circular economy roadmap for Finland (Sitra, 2016) to introduce concrete actions to help Finland emerge as a competitive circular economy nation (Sitra, 2016). Hence, it is plausible to say that sustainability is a current and critical issue. The studies on sustainability from the fields of economy (Anand & Sen, 2000; Common & Perrings, 1992), social sciences (Becker & Jahn, 1999) and others are plenty, but the field of game studies seems to be lagging behind.

2.1. Gamification

2.1.1. Definitions of gamification

Brett Terill (2008) was the first one to mention gamification (spelled gameification) as a phenomenon it is currently recognised. Since then, the interest in gamification has grown in academia (Hamari et al., 2014) to a point of introducing several definitions for the said phenomenon. Perhaps the most classic, already mentioned in the former section, is the one formulated by Deterding et al. (2011, p. 9), "the use of game design elements in non-game contexts". In this definition, the emphasis lies within the *game design elements*, and their implementation into a context altogether different than actual games. An example would be adding elements such as progress bars, achievement badges, or feedback to a system. Practical implications of these include the numerous fitness and health applications available on application stores for contemporary smartphones.

Different viewpoints on gamification lead to different definitions, as Hamari and Huotari (2012) note. Their viewpoint lies not in the elements added to a system but in the goal of creating value to the user. To them, gamification is "a process of enhancing a service with affordances for gameful experiences in order to support user's overall value creation" (Huotari & Hamari, 2012, p. 19). In 2012, there was only one other proper definition for gamification, the one defined by Deterding et al. (2011) (as cited in Huotari & Hamari, 2012). As the writers comment, the understanding of gamification then was ultimately based on the viewpoint that the phenomenon is purely systemic and adding systemic game elements would then gamify a service or system. This is why Hamari and Huotari decided to take on a different point of view, emphasising the experiential aspects of games, hence creating a definition that completely disregards the actual game elements. In their definition, they draw from service marketing literature. According to them, game studies and service marketing greatly complement each other. To the writers, the definition should be based on the elements that have an effect on the players – not necessarily the elements traditionally defined as game elements. These gameful experience-inducing building blocks Hamari and Huotari introduce as affordances. It is crucial to notice that Hamari and Huotari's definition mostly leans on the interaction between the system and user, as gameful experiences emerge from interaction. (Huotari & Hamari, 2012.)

As Huotari and Hamari (2012) propose, gamification should be viewed as a process. Werbach (2014) adds another definition to the mix, stating that gamification is "the

process of making activities more game-like" (Werbach, 2014, p. 266). He argues, having himself defined gamification similarly to Deterding et al. (2011), that the definition of gamification should reform if gamification as a field is to evolve. Werbach comments that in order for gamification designers to truly pay attention to design, the goal is to make the gamified solution as game-like as possible, saying, that using only a couple of traditional game elements is insufficient for expanding the use and potential of gamification. He also makes a remark of the ambiguousness of defining these game elements: as there is no definite list of them, it is problematic to actually define whether or not a gamified system is, indeed, gamified.

In a contrast to Deterding et al. (2011), Kapp takes a broader approach to gamification, stating it is "a careful and considerate approach of game thinking to solving problems and encouraging learning using all the elements of games that are appropriate" (Kapp, 2012, p. 15-16). Kapp claims that the difference between serious games and gamification is that serious games aim to educate by use of game mechanics to create experiences, whereas the goal of gamification is to use game elements to make the user act in a way they would not normally act (Kapp, 2012). To me, this view is problematic, as Kapp seems to neglect the fact of serious games being games, rather, they seem to be experiences presented in a game-like manner. However, as Burke (2014) has said, gamification indeed seems to be a process which aims in changing one's behaviour from something to another.

When observing Hamari and Huotari's (2012) and Deterding et al.'s (2011) conceptions of gamification, it seems clear that in the light of these definitions, much room is left for studying anything that resembles gamification (Hamari et al., 2014). In this thesis, there is no clear following of a certain introduced theory of gamification, albeit the thesis mostly leans on the practical, one might say industrial application of gamification, the application of game design elements in an altogether different context – sustainability. Therefore, the definition closest to the gamification discussed in the present thesis, is that of Deterding et al.: "the use of game design elements in non-game contexts" (Deterding et al., 2011, p. 9). This does not, in any way, disregard the importance of other definitions for gamification – indeed, the reception of gamification, gameful experiences and value creation play a large role in the application of gamification. However, as the application of gamification in this thesis was, in part, created for audiences not extremely familiar with gamification, this thesis will mostly follow the definition most easy to grasp and understand.

2.1.2. The potential and disadvantages of gamification

The interest in gamification has dramatically increased in the past few years, which has resulted in increased research and usage (Schoech, Boyas, Black, & Elias-Lambert, 2013; Linehan et al., 2015). This subsection will discuss the use of gamification: the interest in the phenomenon has increased, but does it work in practise?

The need for analysing whether gamification indeed is an effective way of affecting human behaviour is positively correlating to the rise of interest in gamification. As Hamari et al. (2014) state, the amount of gamification related articles found from Google Scholar database almost ten-folded between years 2011-2013. The articles examined in their study, were mostly in the context of education and learning but one on sustainability was also amongst them. There were several gamification elements, or *motivational affordances* as the writers term them, found in the studies. The most used game elements were points, leaderboards and achievements. Said elements in combination with the player-system interaction seemingly provide positive benefits in the application area, e.g. learning. Hamari et al. (2014) found that, according to the studies examined, the positive benefits apply to "some users for a short time" (Hamari et al., 2014, p. 4).

It is noteworthy that "gamification might not be effective in a utilitarian service setting, but instead engagement by gamification can depend on several factors, such as the motivations of users--." (Hamari et al., 2014, p, 3028). Derived from this, the optimal target audience for gamified services would be the individuals already intrigued by the context matter. That said, the most successful target group for *green gamification* (Froehlich, 2015) would be those already interested in sustainability issues, but not yet making an actual effort in leading a more sustainable lifestyle. These *intenders* (Schwarzer et al., 2010) are individuals who have the motivation, *the intent*, to change their behaviour, but are not necessarily equipped with the right skills, knowledge or tools to act upon that intent, and hence are unable to become *actors*. *Pre-intenders, intenders* and *actors* are the tre-partite model of Schwarzer et al. (2010) regarding an individual's motivation to act upon a subject.

Gamification has received minor critique on the difficulty of applying game elements in non-game contexts (Schoech et al., 2013). The phenomenon has also been declared as *bullshit* by Bogost (2011). He claims that gamification is mostly used by consultants to prove right the opinions of their clients: that gamification actually does not have that

much to do with games, as the *key elements of games applied to non-game contexts* are not games-exclusive elements. These claims all but shake the foundation gamification is built on (Deterding et al., 2011), detaching the phenomenon of gamification from its origin. Bogost (2015) dictates gamification as a party trick of two moves: one being the entertaining characteristics of an ambiguous entity, games, while the other being the "-ification" suffix. This means, that the "-ification" suffix is attached to the word to make the phenomenon more understandable, easily approachable.

However, as gamification has since Bogost's (2011) initial claim been defined again, and in different manner (Huotari & Hamari, 2012; Kapp, 2012; Werbach, 2014), it is plausible to say that there might be some truth, and potential, to gamification, and a counter to Bogost's claims. Numerous studies have found that gamification, indeed, works. In their literature review, Koivisto and Hamari (2019) found that only 6 % of the studies in total resulted in a *negative* or *mixed with negative* results, whereas 75,7 % resulted in *positive* or *mixed with positive* results – the rest being *null* or *equally positive and negative.* In the current climate of gamification, this is, however, quite a trivial matter. At the moment, the interest in gamification has shifted from asking the questions of "why?" to asking "how?" and "when?" (Nacke & Deterding, 2017). Additionally, the way gamification works and motivates differs by design elements chosen for each gamification system (Sailer, Hense, Mayr, & Mandl, 2016).

In her dissertation, Koivisto (2017) presents the dichotomy of service use based on the works of Davis (1989) and van der Heijden (2004), explaining that hedonic use of service is rewarding to the user in its own right, whereas utilitarian use of services oftentimes conceptualises use as a process to achieving something external (Koivisto, 2017). The concepts of intrinsic and extrinsic motivation are discussed more in detail in the next subsection. Gamification, or gamified systems, seem to be in the middle-ground between hedonic and utilitarian: gamification oftentimes is a process to gameful experiences (Huotari & Hamari, 2012), which means that the end result, utilitarian purpose, is achieved through enjoyable, hedonic means (Koivisto, 2017).

Many studies indicate that the implementation of game elements, i.e. gamification (Deterding et al., 2011), enhances the engagement on the subject at hand – heightened motivation and overall performance on tasks have also been found when applying game elements to other contexts. (Alsawaier, 2018).

There are drawbacks, however. It is difficult to sustain the achieved positive behaviour for a long time as the enthusiasm might slowly fade, as using the service becomes mundane or boring (Kawachi, 2017). This is backed up by earlier research from Hamari et al. (2014), who, as stated above, found that the positive changes apply to some users for a short time, which can either be found to be a positive outcome or a drawback, as the positive results are existent, but not a long-term solution. Additionally, Farzan et al. (2008) found that application of a points system heightens the motivation to use a service – however, similarly the initial enthusiasm might decay. Consistently, Koivisto and Hamari (2014) found that the usefulness of gamification tends to decline during the continued use of the gamification service, resulting in a plausible novelty effect of gamification. In contradiction to these viewpoints, Hanus and Fox (2014) found that gamification might well enough reduce the motivation of the users – in their case, reducing the exam scores of students of gamified class, as opposed to those learning through non-gamified means.

2.2. Gamification, motivation and behaviour change

Self-determination theory (SDT) is a psychological theory created by Ryan and Deci (2000) that handles the basic needs, competence, relatedness and autonomy, that create a basis for human well-being, growth and motivation. Different game design elements have been found to impact on these basic needs. For example, a study has indicated that badges and leaderboards affect the needs for competence and autonomy, whereas avatars and stories corresponded well with the need of social relatedness (Sailer et al., 2016; see also Mekler, Brühlmann, Tuch, & Opwis, 2014). Here, we could derive that to motivate the users better, gamification design could fulfil these basic needs as well.

Motivation is valued in the world we live in, due to the simplicity of the outcome of motivation – it can help to reach goals and produce deliverables (Ryan & Deci, 2000). In psychological research, there is usually a clear dichotomy of motivation, that of *intrinsic* and *extrinsic* motivation: in short, the former is motivation driven by internal rewards, and the latter with external rewards (Ryan & Deci, 2000).

Intrinsic motivation is motivation that is driven from the inside of oneself – the tendency of constantly improving oneself by only the satisfaction of the act committed. In intrinsic motivation, there is a complete lack of outer rewards, as the only reward needed for said action is the action itself. (Ryan & Deci, 2000.)

Extrinsic motivation is the opposite of the intrinsic motivation. Extrinsically motivated activity is an activity that in itself is not rewarding but the motivation for completing the task comes from external sources. (Ryan & Deci, 2000). For example, studying hard for a good grade is an extrinsically motivated activity, as is doing homework for one's parents' bidding, whereas studying hard for the pure thirst of knowledge is intrinsically motivated activity. This puts us in a position where gamification is usually applied to systems to extrinsically motivate the users: to fill out a progress bar over and over again is to motivate oneself by an outer source.

Extrinsic motivating brings the best results when combined with one's intrinsic motivators (Ryan & Deci, 2000). For example, extrinsically motivating is more productive when one would be given rewards on a topic, subject they are intrinsically already motivated to act on. Farzan & Brusilovsky (2010) have comprehensively discussed the effect of extrinsic and intrinsic motivators on user engaging.

Gamification aims at making difficult matters feel like leisure, or make activities feel like fun (Kawachi, 2017; Chen & Pu, 2014). Leisure time games might oftentimes house elements of competition – this is also true for gamification. Competition in gamified systems is often two-fold: either the possible competitive elements are against oneself, or against others (Kawachi, 2017). Studies have found (Zhang et al., 2016) that competition against others, teams or individuals, is more probable to result in achieving goals than peer support. However, there are studies which contradict this, finding that cooperation, in fact, increases the effect and the probability of the desired outcome in gamification systems more than competition does (Chen & Pu, 2014). The support or competition with social reference groups in a gamified service can be seen as further increasing chances of achieving goals, as people with endorsement from their close group usually are more likely to experience feelings of relation and engagement (Ryan & Deci, 2000). On the other hand, Chen & Pu (2014) found this *hybrid*, as they call it, to have a lesser impact than pure cooperation.

Gamification has been seen as a way to induce user's behaviour in a desired way, similar to social marketing (Kotler & Zaltman, 1971). It has been noted that the game mechanics, elements themselves play the part of teaching the player or user new skills to overcome emerging challenges (Linehan et al., 2015), and through these attained skills, make changes in the way they act. Gamification is often used as means to change one's behaviour, achieving goals not initially aimed at (Burke, 2014), which bears close ties

with the concept of behaviour change: the realisation of one needing a change, but being unable to actively try to achieve it (Werbach & Hunter, 2012).

Some of the earliest definitions for social marketing is the one defined by Kotler and Zaltman in 1971 as "-- the design, implementation, and control of programs calculated to influence the acceptability of social ideas and involving considerations of product planning, pricing, communication, distribution, and marketing research" (Kotler & Zaltman, 1971, p. 5). At that time, there was a need for definition, as marketing involved more than just the marketing of commodities, such as soap, but marketing of ideas, social ideologies (Kotler & Zaltman, 1971). Since then, social marketing has circled around marketing behaviour change (Gordon, 2011), the idea of behaving differently in a given situation. This aspect of behaviour change was brought to light by Andreasen (1994), when he stated that social marketing aims to influence the behaviour of the target audience. He also made the remark that the behaviour is voluntary, not forced. This brings us a step closer to games, and therefore gamification, as a number of definitions emphasise the voluntary characteristic of games (Huizinga, 1944). Depending on the definition, this is also crucial for gamification to succeed, as the voluntariness, in addition to having intrinsic motivation, plays a major role in the emergence of gameful experiences (Huotari & Hamari, 2012).

If social marketing aims at selling, or making originally disagreeable behaviour wanted (Mitchell et al., 2016), it has close ties with gamification, which is oftentimes applied to affect the user's behaviour in a desired way (Mitchell et al., 2016; see also Burke, 2014; Kapp, 2012).

2.3. Gamification and sustainability

This chapter focuses on sustainability, sustainable development and the three pillars of sustainability (Hansmann et al., 2012). I will also juxtapose sustainability with gamification, examining their relations and goals for combining them with each other. During this section, the concept of carbon footprint is introduced and explained.

2.3.1. Greenhouse gases and carbon footprint

Greenhouse gases affecting our climate are plenty, although carbon dioxide (CO_2) is the most common and well-known. There are several other greenhouse gases warming the

planet, such as methane and nitrous oxide. To simplify the matter, a concept of carbon dioxide equivalent (CO_2e) has been introduced. CO_2e takes into account, in addition to the carbon dioxide emissions, other greenhouse gases causing global warming, presenting them in a simple, easy to understand form. (Brander & Davis, 2012.) In this thesis, the main term used to discuss greenhouse gases, is CO_2e.

The origin of the carbon footprint lies in more developed countries, where the public grew an interest in environmental issues, building a feeling of responsibility to take actions against global warming (Goodall, 2007). The activity of the general public led to a situation, where the need for a tool to measure one's environmental impact arose, leading to the concept of a *carbon footprint* (Pandey, Agrawal, & Pandey. 2011).

The carbon footprint can be regarded as direct or indirect (Pandey et al., 2011). An example of a direct carbon footprint would be the emissions caused by driving a personal gasoline-operated vehicle. The gas emissions directly contribute to the global warming, whereas using an electric car does not, as it is powered by electricity. However, if the electricity used to charge the car is generated using non-renewable energy, even driving an electric car would contribute to one's carbon footprint – this is the indirect contribution to one's carbon footprint. However, if the car was charged using certified renewable green energy, carbon emissions generated from its usage would be zero. It is noteworthy that this only takes into account the usage of the car – not the carbon footprint of the manufacturing of the car itself and the resources used in building it.

2.3.2. Sustainability and sustainable development

Per recent reports on global warming (Intergovernmental Panel on Climate Change, 2018), it is fundamental for sustainability issues and how to combat them to become common knowledge. The report of Intergovernmental Panel on Climate Change (2018) brings grim news on the importance of having the global warming stop at 1,5° Celsius.

Sustainable development is "development which meets the needs of the present without compromising the ability for future generations to meet their own needs" (World Commission on Environment and Development, 1987, p. 43). Sustainability is considered three-dimensional, with dimensions of economic, social and environmental sustainability. These three dimensions are called the three pillars of sustainability (Hansmann et al., 2012). I will briefly go through the pillars of sustainability, although the most examined dimension in the present study is the environmental dimension of sustainability.

The three-pillar or three-dimension model has also been met with criticism, for example as it does not include the cultural dimension, which in addition would be important to preserve for the future generation. It is also important to note that ubiquitous equality is almost impossible to achieve, which disrupts the balance needed amongst the three dimensions of sustainability. (Hansmann et al., 2012.)

2.3.3. Economic, social and environmental sustainability

Economic sustainability is most often understood as sustainability of an economic state: "How can we meet the economic needs of the present without diminishing economic opportunities for the future?" (Ikerd, 2012, p. 1.) Providing basic economic needs results in a stable society where everyone is provided with adequate state of living: food, accommodation, so that the living conditions would be as equal as possible, and sustainable. (Ikerd, 2012).

Social sustainability is "the quality of societies" (Hansmann et al., 2012, p. 11), where the nature is not exploited whilst providing the human race with their basic rights and not diminishing their dignity. In a socially sustainable society, humans are allowed to participate in building the society. These needs are to be provided in regards of both environmental and economic sustainability to balance out the pillars of sustainability. (Hansmann et al., 2012.)

The terms of environmental sustainability and ecological sustainability are both used when talking about the current environmental state of the planet. Morelli (2011) takes into account the difference of meaning between ecological sustainability, and environmental sustainability, of which the latter usually is affiliated with human interaction, whereas ecological sustainability is seen as a broader term with lack of human interaction with the environment. He defines environmental sustainability as "*meeting the resource and services needs of current and future generations without compromising the health of the ecosystems that provide them"* (Callicott & Mumford, 1997; as cited by Morelli, 2011, p. 2). Morelli (2011) specifies his definition even more, emphasising the need for balance and stability in meeting the needs of the human society while still leaving time for the environment to regenerate after the humans have reaped it, and acting in a manner that never damages biological diversity. This, while an admirable goal, is quite impossible to achieve, as many of the industrial changes have tremendous impacts on biological diversity. This is, in some cases, compensated with biodiversity offsetting, the

goal of which is compensating the biodiversity loss in one place by biodiversity gain somewhere else, ideally resulting in a situation called No Net Loss (Apostolopoulou & Adams, 2017).

The present thesis will mostly discuss environmental, not ecological sustainability, as the examination revolves around human interacting with the environment, and how the actions or inactions with environment could be inspired to be pro-environmental through the use of gamification.

3 SITOUMUS2050 SERVICE

3.1. The service, Society's Commitment's objectives and Agenda2030

Sitoumus2050 is a web-based service focusing on gathering society's actors and individuals to act more sustainably through operational commitments. The service is owned and administrated by the Prime Minister's Office of Finland. Sitoumus2050-website includes an introduction to sustainability issues and society's commitments to combat them. The user is able to observe the different societal actors', e.g. registered associations' and companies', written commitments in different areas of sustainability and environmental issues. In addition, the users are able to commit themselves to the topic and therefore make concrete actions to a more sustainable world and society through the use of the Lifestyle test and operational commitments. The ultimate goal of the service is to make Finland, and the world, more sustainable come year 2050. ("Society's Commitment's Objectives", n.d.)

Both the Society's Commitment's Objectives (SCO) and Agenda2030 aim at a more sustainable world and way of living. The Agenda2030's 17 Sustainable Development Goals (SDG) include the goals needed for a sustainable world and were created by the UN. SCO's were created by Finnish National Commission to implement the UN's goals on a national level ("Operational Commitments," n.d.).

Society's Commitment's objectives are as follows ("Society's Commitment to Sustainable Development – objectives," n.d.):

1. Equal prospects for well-being
2. A participatory society for citizens
3. Sustainable employment
4. Sustainable society and local communities
5. A carbon neutral society
6. A resource-wise economy
7. Lifestyles respectful of the carrying capacity of nature

8. Decision-making respectful of nature

The SCO's include the UN's Sustainable Development Goals (SDG) presented in the Agenda2030, as presented in the Figure 1.

Figure 1: How SCO are related to with Agenda2030 goals ("Correspondence of the Society's Commitment and Agenda2030," n.d.)

3.2. Lifestyle test

The Lifestyle test is an essential part of the Sitoumus2050 service. Created by the Finnish Innovation Fund Sitra, it is now the owned product of the Prime Minister's Office of Finland.

The Lifestyle test consists of a set of questions divided into four themes, or fields of lifestyle. The themes are *living*, *transport and tourism*, *food* and *things and purchases*. Answering the questions provided results in an estimated carbon footprint of the user, and the ultimate attempt is to halve the current estimate by making operational commitments and actions towards a more sustainable lifestyle.

Through taking the test, the user is provided with an estimate of their carbon footprint. The estimate is calculated through the choices the user makes in their daily life, including

dietary options, usage of public transport versus personal car or other vehicle, using licensed green electricity, consumption habits, hours flown during the past year, to name a few. These choices contribute to the overall carbon footprint, either decreasing or increasing it in comparison to other more or less sustainable options chosen.

After answering all of the questions, the system provides a comparison between the user's carbon footprint and the average carbon footprint of those who have taken the test (see Figure 2), including the sectional division of the carbon footprint.

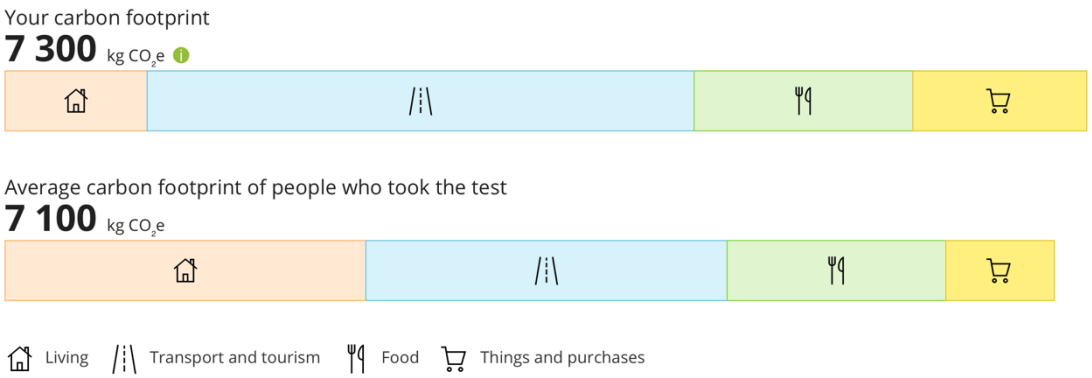

Figure 2: Screenshot of a comparison between a user's carbon footprint and the average of those who have taken the test (Sitoumus2050 service)

After completing the Lifestyle test, suggestions for different ways of reducing the carbon footprint are presented to the user. These are also divided into the four themes mentioned above. For example, the service might suggest lowering the indoor temperature at an empty summer cottage and provide additional information on how this affects the user's carbon footprint. Users are able to either set the suggestion as *already doing this* or pick the action to be done in the future. The system then provides the calculations as to how much the picked action reduces the user's carbon footprint.

After picking the lifestyle changes the user is trying to achieve, the system gives an estimate on how much the choices made would reduce the carbon footprint of the user (see Figure 3).

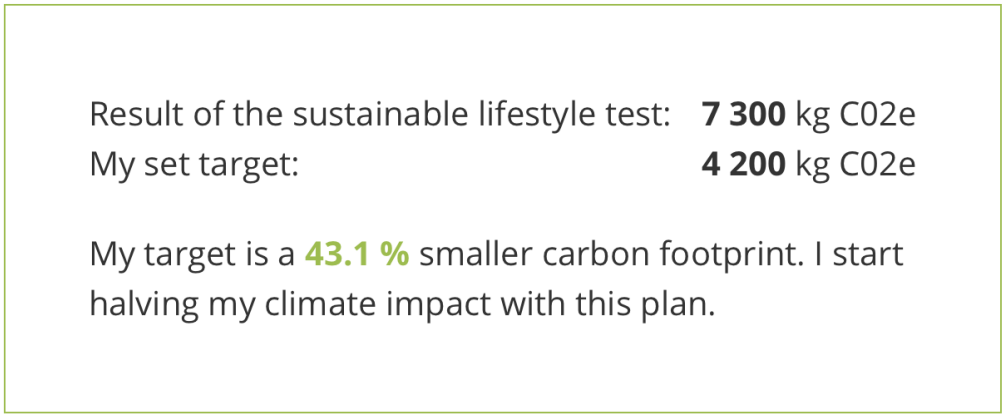

Figure 3: Screenshot of an estimate on the reduced carbon footprint of a user (Sitoumus2050 service)

At the time of writing (27th February 2019) the combined amount of CO_2e committed to reduce by those who have completed the test is 1 368 300 kg, including both the published information and the ones left as drafts. The amount including only the published commitments is 967 800 kg CO_2e. (Prime Minister's Office, personal communication, 2019).

4 RESEARCH METHODS

4.1. Expert interviews as a data gathering method

The research method used in the present Master's thesis is interviews. I chose to conduct the interviews as expert interviews, as the large-scale opinion of experts was the most suitable approach to this study, as these interviews are used to gather fact information from experts on the field (Hyvärinen, Nikander, Ruusuvuori, 2017). The reason for conducting expert interviews was to shed light on the phenomenon, and the potential of gamifying carbon footprint calculators – ultimately to find the approval of experts of relevant fields for the application of gamification in this field. Although, as told in Tutkimushaastattelun käsikirja (*Handbook of interview research*) by Hyvärinen et al. (2017), the role of an expert or the expertise on the relevant field is problematic to define, the present study views the interviewees as experts on their own fields, for their continued expertise in their fields. In this interview, the participants were chosen for their information on the phenomena and their institutional position (Ruusuvuori, Nikander, Hyvärinen, 2010), and not because of their character.

Focus interviews were chosen for their proper fit for an expert interview (Hyvärinen et al., 2017). In the focus interviews for this study, a set of half-structured questions following certain themes was used. The questions were not necessarily needed to be asked exactly in the form they were written, as the interviews could take unexpected turns to provide more data than the interviewer initially had expected.

The experts in the present study were chosen either on their connection to the case study or their expertise on the fields of study this Master's thesis discusses. As told before, the fields of study are those of games and gamification, and environmental sustainability. As such, the experts chosen were a user interface designer (industry aspect), an employee of Finnish Innovation Fund Sitra (environmental sustainability), a gamification researcher and an employee of the Prime Minister's Office (Sitoumus2050 approach); for more information, see the interviewee profiles (Appendix 1). Although a small set of interviewees, they were chosen for the core analysis to focus on these four viewpoints on the topic and if similar or differentiating topics and themes would be found during the interviews.

In all interviews, the role of the interviewer is major. The presence of the interviewer affects both the interviewee and their answers (Hyvärinen et al., 2017), therefore it is important for the interviewer to be present the whole session, as a part of the discussion. As the facts that emerge as part of the interview are the result of the combined effort of the interviewee and the interviewer (Ruusuvuori et al., 2010), one cannot disregard the effect the interviewee's involvement has on the data resulting from the interview. As all the data gathered is filtered through the interviewer, the resulting data and analysis will ultimately be biased. To deflect and neutralise the potential bias of the research, the interviews and the views on the topics of the interviews were attempted to keep as objective as possible, not focusing on either the potential or the drawbacks of gamification but keeping the focus on both positive and negative views. During the interviews, the goal was to gather data from different viewpoints, to achieve as neutral data as possible.

4.2. Research material – the interviews

In this Master's thesis, the names and any other personal information of the interviewees are anonymised. However, for the reader to understand the possible similarities and confrontations regarding the interviewees' points of view, the area of expertise of the interviewee is revealed. They will be referred to as P1-P4, where

- P1 is the User Interface Designer
- P2 is the expert on environmental sustainability and employee of Prime Minister's Office of Finland (owner of the Sitoumus2050 service)
- P3 is the employee of Finnish Innovation Fund Sitra and
- P4 is the gamification researcher.

Interviews with P1-P3 were conducted in Finnish (Appendix 2) and interview with P4 in English (Appendix 3). Initially, all of the interviews were supposed to be conducted personally, physically in the same space. Due to some scheduling problems, all of the four interviews were instead conducted via Skype. Although approached with some problematic viewpoints (see Ruusuvuori & Tiittula, 2005), I believe that no important data was lost when conducting the interviews via computer-mediated communication. All of the interviews were recorded with two recording tools and transcribed afterwards.

Nearly all of the information in the interviews was transcribed. Sounds, like sighs and grunts, and repetitions were left out, as there was no need for deeper discourse analysis. There are no mentions of tones of voices or accents, either, in the transcriptions. In three of the four interviews, out of the transcription process were left the sections where the interviewer introduced the gamified concept of the Sitoumus2050 (more information on this in the following subsections), as it was mainly a monologue and a presentation of the concept. These introductions can be found in section 4 of the present thesis. One of the interviewees (P2) gave input on the concept during the presentation, and therefore this section was transcribed as well.

One interview (P3) had some technical problems, which made it impossible to finish the interview during the allocated time. The rest of the interview was conducted via e-mail during the following week. This did not have an effect on the quality of data.

In the interviews, the emphasis was on the interviewees' personal opinions of the phenomena – because of this it was important to let the interviewee somewhat dictate the course of the discourse (Ruusuvuori et al., 2010).

All in all, the data gathered through interviews finalised as 32 two pages of transcription.

4.3. Thematic analysis

As Ruusuvuori et al. (2010) write, when conducting expert interviews, the planning of interviews, interviewing the experts and analysing the data often interlock together as the interview questions are usually formed considering who the planned interviewees are. To ensure that the interviewees all held a somewhat comprehensive understanding of the field of gamification and gamifying services, a gamified concept of Sitoumus2050 was included in the interview (see below). Usually in expert interviews, it is crucial to define and state what of the concepts and matters handled are, indeed, facts (Ruusuvuori et al., 2010). However, this thesis mainly focuses on opinions and views on the discussed themes, and their potential effect on different variables. Therefore, the attempt of the interviews was not to state or find facts, per se, but uncover the views and opinions of the experts on the themes discussed.

The chosen analysis method for the gathered data is thematic analysis. In thematic analysis, the data is organised in themes: these themes are found when analysing the data,

to see which phenomena emerge most often (Eskola & Suoranta, 1998). As Eskola and Suoranta write, the structure of the interview is often enough for the thematic structure of the analysis (1998). The themes that emerged from the data were found to support the research problem, and in part, answer the research questions presented in the beginning of this thesis, therefore the analysis was categorised into themes following the structure of the interview. Furthermore, these themes are observantly similar to the questions asked in the interviews; this being obvious as the themes in the interview focused around the questions asked from the interviewees. Often, the analysis is closely tied with the theory of the phenomena discussed, therefore the narrative of the results section references to the literature of both gamification and sustainability.

Thematic analysis is an especially practical tool when finding a solution to a concrete problem (Eskola & Suoranta, 1998). While not the most concrete of theses, the present study is conducted to find justification for gamifying a service: in part the results will try to find an answer to this.

4.4. Gamified concept of Sitoumus2050 – a tool for the interviews

As of now, the Sitoumus2050 service includes close to no gamification elements. To understand the potential of a gamified service and to expand the understanding of a gamified system, I decided to create a concept draft of Sitoumus2050 including elements of gamification also mentioned in the literature review. This way the interviewees, especially those with little or no experience on the field of games and gamification would ideally better understand the phenomenon and what novel approaches it could potentially bring to the service. It is fundamental to emphasise that the concept draft created and presented as part of the interviews is by no means a complete product nor will it be presented in such way. The sole purpose of the concept draft is to serve as a tool for the interviews to better grasp the idea of a gamified service. As such, the concept draft has only the necessary elements which ideally form a gamified concept.

4.4.1. Process

In Koivisto and Hamari's study (2019), they found that most used gamification design elements are points, badges and leaderboards. These, and progress tracking have all yielded positive results. Although cooperation, in regards of their large scope of study, was not implemented much, other research speaks for the benefits of cooperation, and

contribution to community (Kollock, 1999). When concepting the gamification of Sitoumus2050, I decided to focus on three areas: progress accumulation, achievements and sense of community (social aspect) – all of which would also provide feedback to the user.

Main focus point of the elements will be on sense of community, the social aspect of the concepted system. The planning began from a contesting viewpoint where people would compete against one another on who progresses the most: leaderboards would favour the user with most progress measured in per cents. This, consequently, favours the user with the highest initial carbon footprint, making it impossible for the users already making significant efforts in regards of the environment to top the charts. It has also been noted that there is noticeable absence of community engaging affordances in gamification research and services and filling the gap would be of significance to gamification research (Koivisto & Hamari, 2019).

These notions lead to a planning of the *sense of community* mentioned above. In this concept, users are linked together by some common characteristic, e.g. their location. One city, street, building or household would be pitted against other similar groups in a contest of which, in a period of set time, achieve the best results in reducing their carbon footprint. In this way, users would act in loose teams to overcome others' teams. This would hopefully inspire the users to not disappoint their community when aiming for the leaderboards.

In addition to the sense of community, the gamification elements planned include progress accumulation and achievements, each linked to every other element. However, the focus is more on engaging the community as a whole, as many gamified solutions follow the points-badges-leaderboards "blueprint", as Koivisto and Hamari (2019) argue, which might lead to a more technical gamified solution, without the emergence of gameful experiences per se. Progress would be visualised by bars, the end of which would be the half of the user's initial carbon footprint (user with, e.g. the 7 100 kg CO_2e mentioned above would strive to achieve a carbon footprint of 3 550 kg CO_2e). The bar fills as the user commits to and acts on their commitments. The achievements, then, would be feedback of progress, prizes. These achievements would be earned both by reducing one's carbon footprint measured in per cents and by different actions, such as reducing meat consumption or eliminating it altogether from one's diet. Each of these actions in turn progress one's community towards the top of the leaderboards.

Game-related motivation and fun is usually born from several, individual factors, whether they are achievement-gathering, societal or immersing oneself in the stories and lore (Koivisto & Hamari, 2019). Achievement-gathering is the most usual way of gamifying a service (Koivisto & Hamari, 2019), and societal means are included in the concept of Sitoumus2050 as argued above. Immersion, story or lore is, however, extremely difficult to implement into a service which ultimately serves a utilitarian purpose first and fun the second. Therefore, the only element of the concept related to the immersion is the use of pre-built avatars. This is for two reasons: 1) avatars make it easier for people of the communities to recognize each other but 2) they don't identify them as such, therefore they stay completely anonymous, as the service would use relatively close communities, such as people living in the same building. The users would not be able to upload pictures of their face or anything else.

Regarding the current state of Sitoumus2050, there are some difficulties in creating a gamified concept of it. As users themselves choose the actions they are going to commit to, there is no way of tracking their progress automatically, as opposed to, e.g. exercise tracking applications. The progress they achieve in the service is completely dependent on the *user's commitments*, whether they indeed act on those commitments, is not visible in the service. A reminder feature could be implemented, in which the user is noted weekly, whether they are still upholding the commitments they made, which then would affect the overall progress of the user. The initial problem still persists, however, as the progress of the user and the whole community is completely dependent on the user's integrity.

These complications lead to designing the concept in such a way that the initial commitment grants no progress. Committing to sustainable actions sets the target for the carbon footprint reduction, and the weekly check-ups grant points. This is believed to help the user continue using the service after the initial commitments. However, this does not remove the fact, that the use of the service depends on the users' truthfulness.

These plans are visualized in the next chapter where the concept of gamified Sitoumus2050 is shown.

4.4.2. The concept

Here, I will present the gamified concept of Sitoumus2050 service. The affordances selected to be included in the concept, and the reasons for choosing them are explained

above. The template on which the affordances were added is a screenshot from Sitoumus2050 service, the profile of the user. The elements were then added using Photoshop CC. Any personal details (name, e-mail) were hidden from the template used. Below is the original screenshot of the service, with no modifications done (Figure 4).

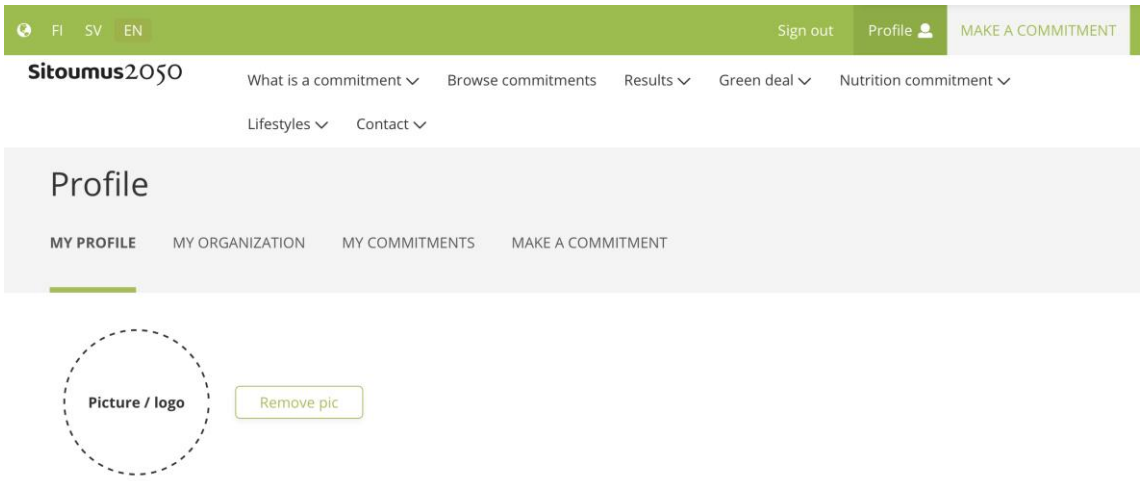

Figure 4: Screenshot of Sitoumus2050 page without any modifications done

Below (Figure 5) is a draft on adding different sections to the user's profile. In addition to the original *My profile, My organization, My commitments* and *Make a commitment,* two features, *My progress* and *My community* were added.

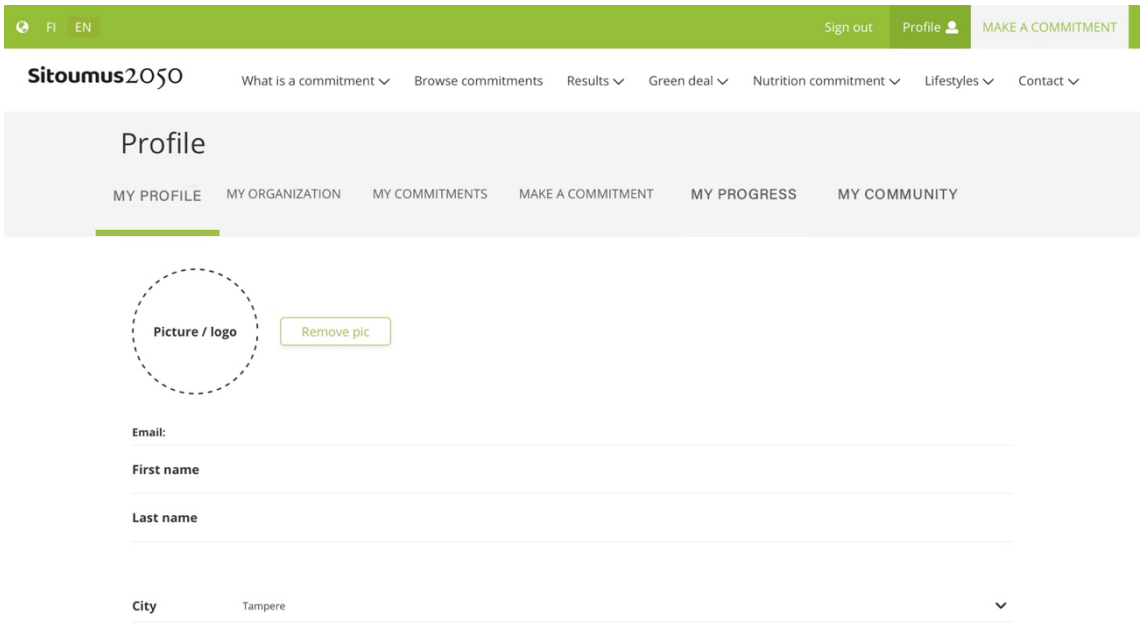

Figure 5: Screenshot of Sitoumus2050 website, user profile

The *My progress* (Figure 6) section of the service is one of the two added sections of the user's profile. *My progress* shows the cumulated points of an individual user. These are visualized by a progress bar, in which the goal progress (3 550 kg) is the committed decrease in the user's carbon footprint. This is, earlier in the service, determined by the commitments chosen to uphold.

Below the bar, the progress of the user is shown by section, in radial progress indicators. The sections are the same as the ones in Lifestyle test: *living, transportation, food* and *consuming.*

On the right-hand side of the page, the user can see their achievements, awarded by milestones or essential accomplishments, for example for changing one's regular electricity to certified green energy.

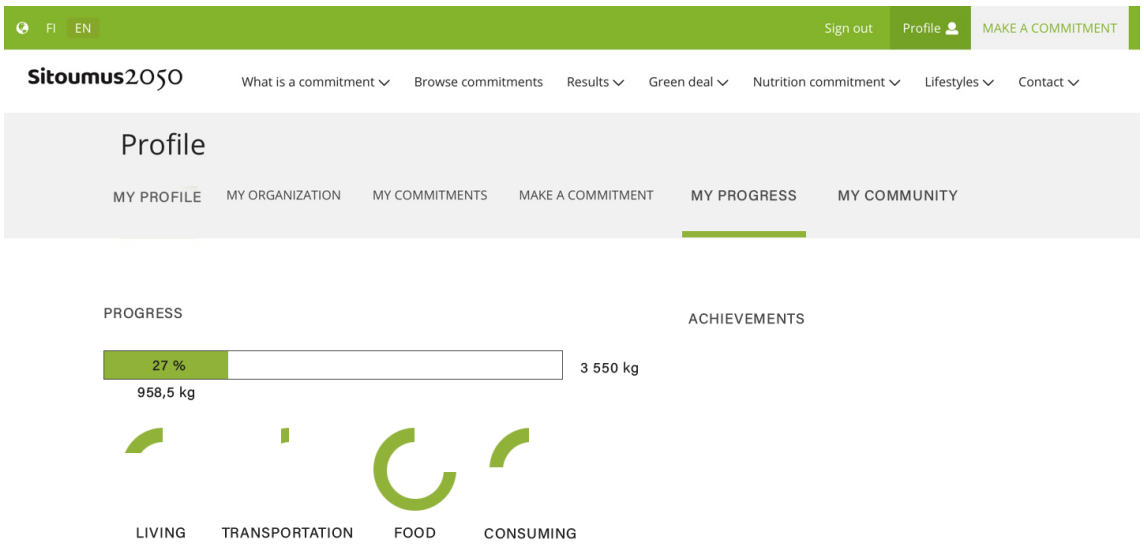

Figure 6: Screenshot of Sitoumus2050 profile, My progress

The *My community* section (Figure 7) starts with choice of which community would the user like to observe more carefully. The user can choose on the level of their city, street, stair, or household.

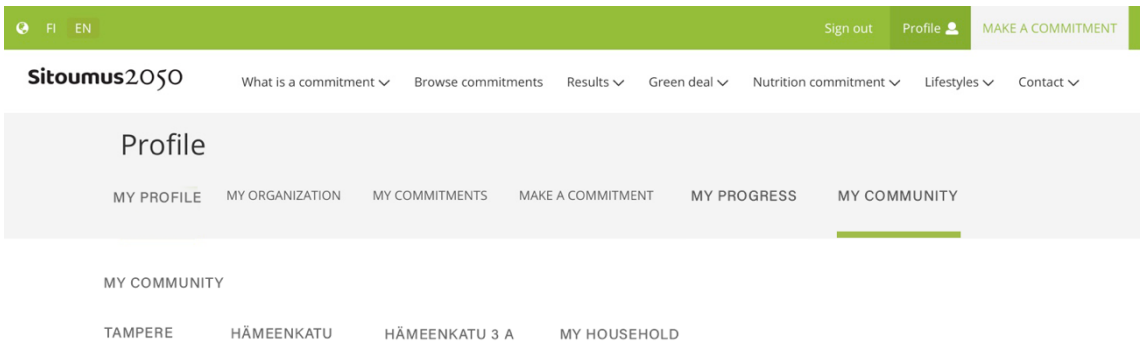

Figure 7: Screenshot of Sitoumus 2050 profile, My community

After selecting the level on which the user wants to observe the community's progress, they are shown a progress view, similar to the one on the *My progress* page (Figure 8). This is the progress of the whole selected community, or rather, the inhabitants of the community that are users of the service. The goals of these users are summed together and presented in the same way as in the individual progress page. On the right-hand side of the page, the user can observe their individual effort in proportion to the community's.

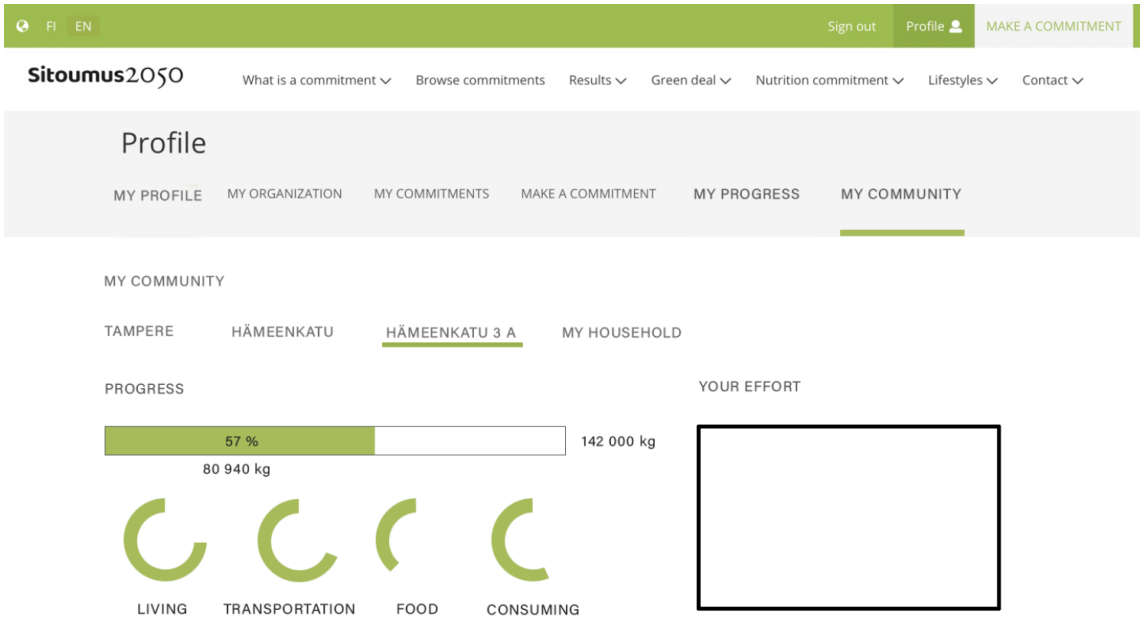

Figure 8: Screenshot of Sitoumus2050 profile, My community, Observation on stair-level

Below the initial view of the *My community* page (Figure 9), the user will find a map of the region they live in; the location where the user and their peers influence. The amount of real-life space the embedded map shows depends on the level of observation the user has selected: selecting the stair (Hämeenkatu 3 A) the user lives in shows other nearby

stairs in comparison to the user's own, selecting the street (Hämeenkatu) would then show other nearby streets (Tampere Centrum, in this case) whereas selecting the city the user (Tampere) lives in would show the whole country (Finland) or a smaller part of it. The colour coding on the map is explained in the legend next to it. In this view, the user is able to compare the effort the community has made on reducing their carbon footprint as opposed to other communities.

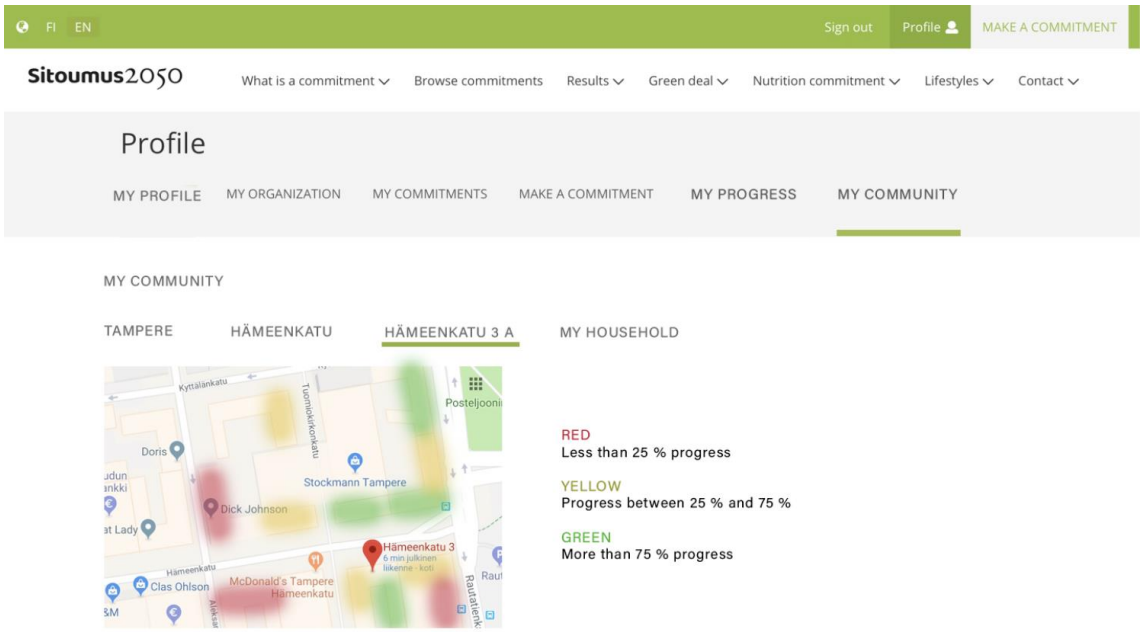

Figure 9: Screenshot of Sitoumus2050 profile, My community, map view

4.4.3. Problems regarding the concept

Even though not a concrete part of the research, some issues were found and addressed regarding the concept. As usual in gamified services, where the information input is solely the responsibility of the user, there lies a chance of misconduct. It is possible for the users to add false information, to proceed faster than their peers. This is, however, a problem in almost every service where the responsibility of added information is that of the user, and therefore the effect of it can be thought of as minimal.

Also, the matter of GPS security arose, as the service uses the location of the user. However, as the concept as is only functions as a browser version, it is possible to rule out the GPS use altogether – this way the security issues vanish. One could enter their address or building they live in, and the service would only use that information to form the community statistics. As everything else is anonymous, few security threats would remain.

5 ANALYSIS AND RESULTS

The results and analysis section will present the results from the data. The data was split into themes, mostly by the different sections of the interview. As noted in the previous section, it is not uncommon to conduct a thematic analysis based on the same structure as was used when interviewing the participants (Eskola & Suoranta, 1998). Some questions or topics have, however been combined for better presentation of the gathered data. In addition, there is no data or analysis based on the presentation of the concept, as it was mainly a monologue on the interviewer's part and included almost no new information to present or analyse. This section is presented through those themes, where the interviewees are referred to as P1-P4 (see Appendix 1 for more information on the interviewees). This section also includes the analysis based on the interviews.

Themes derived from the interviews are as follows:

(1) position and viewpoint on gamification, the differences between games and gamification, the effect of gamification on users,

(2) position and viewpoint on sustainable development,

(3) Sitoumus2050 and its gamification, the potential consequences of its gamification,

(4) the position regarding the concept and the potential consequences of gamification, if they differ from those expressed before presenting the concept,

(5) the elements of gamification in the concept, mainly social dimensions, progress and competition, and finally

(6) the most important elements of gamification regarding the present context and any other comments or additions to the concept.

5.1. Viewpoints on gamification and its potential effect on users

In general, gamification was unanimously considered as a welcomed method in designing services and their parts, per opinions of the interviewees. None of the interviewees thought of gamification as an entirely poor way of designing software or services. However, some concerns of gamification arose. Likewise, the interviewees all mentioned comparable descriptions on what gamification is and on how gamification and games

differ, in relation to their background and knowledge of the field of gamification or games. Some misconceptions on gamification versus games occurred (P2, P3), but in these occurrences, the interviewees were informed about the difference between them.

All in all, all interviewees seemed to generally grasp the idea of gamification, summarizing the phenomenon as an entity that is changed to another, when added with affordances (game elements) not common in the original context. However, most of the definitions only included comments on the affordances implemented into an entity – not necessarily the experiences the user might get from using a gamified software (P1, P2, P3). In other words, the interviewees definitions closely resembled that of Deterding et al.'s (2012), and less the other definitions introduced in the literature review. The relation with learning experience was also mentioned (P3), which could be compared to the non-definition of Kapp (2012), where he claimed that serious games are the ones that aim at learning experiences, whereas the goal of gamification is changing one's behaviour. Most of the interviewees (P1, P2, P3), however, mentioned the "fun" and "enjoyment" included when using a gamified service, which could be reflected to gameful experiences produced by gamification (Huotari & Hamari, 2012; Werbach & Hunter, 2012).

In the interviews, a common opinion was gamification being a good tool to use when designing services. However, not all of them were fully familiar with the concept of gamification, some mentioning that they have, indeed noticed the phenomenon and its existence during their work but not formed a professional connection to gamification (P2, P3). The interviewees were asked to name some elements or ways most common when talking about gamification, to ensure they grasped the idea of gamification – all of them mentioned some of the usual elements of tracking one's progress, narrative, competitiveness, social aspects, rewarding system and the levels of difficulty (Koivisto & Hamari, 2019).

The participants mentioned that gamification is a way to get users to take interest and maybe even addicted to the service and in such a way, to create altogether new habits for them (P1, P2, P4). Through gamification, it is possible to get interested in topics one is not familiar with or increase the frequency of using the services, or at least harness the positive benefits of gamification temporarily (Hamari et al., 2014). However, the individuality of users was also mentioned – some might not be motivated through the same means, e.g. comparing one's own progress to others', making gamification a way of designing services that might alienate some of the potential users (P2). This could

become a challenging design problem, as not the same way of designing services always works for everyone (P1, P2, P3).

Some of the participants felt that the intrinsic motivation regarding the topic of the service that is gamified is extremely important for the conscious end goal to affect one's behaviour, and to use a gamified service as a tool for doing so – these matters were almost solely compared to the themes of health, exercise and diet (P1, P3). This is shown also in prior research, as gamification may functions better when used by people already interested in the substance (Hamari et al., 2014), which would shift the users from *intenders* to *actors* (Schwarzer et al., 2010). However, it was also noted (P2, P4) that gamification is a great tool for diving into topics and habits that, on their own, would not be enjoyable, but become enjoyable when they are combined with a gameful environment which complements the prior research (Kapp, 2012; Burke, 2014). In this way, gamification might motivate the user to do something they would not normally do, without the intrinsic motivation on the topic. However, there is a possibility that this would lead to a situation, where the extrinsic motivator becomes null, and the motivation to use the service ceases (P4). This, too, can be considered a design challenge to overcome, however, as shown, the positive benefits of gamification inflict upon "some users for some time" (Hamari et al., 2014, p. 4), meaning that the initial eagerness might cease, given time, despite good designing.

As said, some concerns of gamification also rose. During the interviews, the participants mentioned that the downsides of gamification are the possibility of getting too addicted to the service (P2), and the possibility of forming habits that are unwanted (P1).

Also, the problems of not designing gamification well were also mentioned: if the service is only gamified via adding elements common in games to a non-game context, the extrinsic motivation might fail to shift into an intrinsic motivation, leading to the abandonment of the service when the "points and badges become boring" (P4), as noted formerly. Research stands behind this statement as well, as the gamified services have a possibility of becoming mundane (Farzan et al., 2008; Hamari et al., 2014; Koivisto & Hamari, 2014), which would lead to lessened usage.

The difference between games and gamification seemed quite clear to the participants. However, there were some mix ups with serious games (see Kapp, 2012) and education

games. Still, all of the participants mentioned gamification's potential to affect one's behaviour, as has several studies mentioned (Burke, 2014; Kapp, 2012).

5.2. Viewpoints on sustainable development

The interviewees' views on sustainable development were convergent and contributed to each other. Two out of four participants were working on topics related to sustainability and sustainable development (P2, P3), whereas two were not professionally familiar with the phenomenon (P1, P4). However, all of the interviewees were confident in their understanding of sustainability, saying that sustainable development is development that takes into account the boundaries of economy, environment and society - that the development is conducted in such a way that we preserve the planet for future inhabitants as well as for ourselves. These views converge with the three pillars of sustainability by Hansmann et al. (2012). The importance of sustainability lies in "furthering humane well-being without endangering the boundaries of the planet" (P2). Sustainable development, in part, is finding a way to "continue driving a car whatsoever" (P4), by creating altogether new ways to power the vehicle, without sacrificing the well-being of the planet. Both of these are backed up by studies and earlier definitions as presented in the literature review (Callicott & Mumford, 1997; as cited by Morelli, 2011; WCED, 1987) This means, that in order for us to continue living the way we are used to, we should either (1) create a way to greatly reduce the emissions our daily actions include, for example by switching into electric cars, or (2) change the way we live our lives in a way that reduces CO_2e emissions. As only the second one addresses the root cause of the sustainability issues, it is the best solution for solving these problems with the long-term development of humanity in mind. This thesis aims to find one capable solution to this. Furthermore, it has been shown that the increase in consumption has been as great as to diminish the pro-environmental impact of technological achievements (Steg & Vlek, 2009).

5.3. Sitoumus2050 and the potential of its gamification

None of the interviewees thought that Sitoumus2050 would suffer from gamification, were it done correctly and according to the wishes of the owner of the system. The matters emerged related to the way of gamifying the service, including the seriousness required for a service owned by a Prime Minister's Office of Finland (P2). Those with professional

connection to the service mentioned the already on-going talk on gamifying the service (P2, P3). All in all, the participants thought the service would benefit from gamification.

In short, Sitoumus2050 would work best were its goals cut down to smaller, easily achievable goals (P1, P2, P3, P4), with social aspects (P2, P3, P4), reminders (P1, P4), progress tracking (P1, P2, P3, P4), and difficulty levels (P2, P3). As of now, some of the participants felt that gamification could encourage the user to return to the service once they have committed to some life changes (P1, P2, P4). It could be hypothesized that only those personally invested in living more sustainably would have interest in returning to the service without external or additional encouragements, such as gamified attributes. However, even if they were, the users could attain the information provided by Sitoumus2050 on their own, unrelated to the service. Reminders, social aspects and properly designed progress tracking would combat this. If the users would be able to interact with the system, regularly observe their progress, or get reminded or rewarded by the service, they would probably be more willing and probable to return to the service (Huang & Soman, 2013). The studies have found that gamification works in both ways, as they say it greatly affects those, who have interest in the context matter but no motivation to act (Hamari et al., 2014), but also helps users achieve the goals they would not have initially tried to reach for – in other words, they were motivated extrinsically to reach their goals (Burke, 2014).

The progress tracking, as it is the base for much of the other functionalities wanted (P1), would best work when done in a visually pleasing way. Some interviewees mentioned the inclusion of points (P1, P2), whereas others disregarded points altogether, as they felt the points are left lifeless and without meaning (P3, P4) – this could be combated by presenting the progress in a more visual way, for example as CO_2 reductions (P3, P4). Points, for the sole merit of including points, has also been dictated as poor gamification design as the gamified solution should also include gameful experiences (Huotari & Hamari, 2012). The points included in the service, should have a meaning, a context in the service (P4).

The goals, or commitments, were felt too large to successfully complete in an enjoyable way (P1, P4). An enjoyable, gameful approach would require cutting the goals to smaller pieces, e.g. refusing to fly for two months, then half a year, then a whole year; or going vegetarian for a month, then trying vegan diet for a week, and such. This would bring the element of difficulty progression to the service, providing the user with a set of easy,

quickly achievable tasks in the beginning and more challenging tasks as they journey further (P1, P2, P3, P4). In so doing, the initial fast paced progress could motivate the user extrinsically, and result in an intrinsic motivation as they get deeper into the topic – this would use the potential of motivation to its fullest, as people are most eager when motivated both intrinsically and extrinsically (Ryan & Deci, 2000).

The completion of these would then be encouraged through reminders. As of now, Sitoumus2050 does have a reminder system: the user can customize whether they receive reminders monthly, once half a year, or annually. These reminders are sent through e-mail. As the participants also mentioned, the reminder system would require more interactivity, thus producing a need for an app-like design for the service (P1). However, as this is irrelevant to the topic, it will not be observed further.

All of the participants felt that the service would benefit from implementation of a social dimension. The themes of social dimension split into two: competition and collaboration. From these two, collaboration was thought to fit into the service better, as environmental themes and sustainability often are a matter for communities and not single person activities. From this we could derive that sustainability is a team sport – in addition, the origins of the environment movement also lie in group activities, it would seem natural for environmental sustainability to be thought of as a common goal, rather than a race of the fittest. However, research has shown that competition leads to better possibilities of reaching goals, than peer support does (Zhang et al., 2016). An element of collaborative competitiveness was also mentioned, as the user of the service might be interested in observing the percentage of how much they have affected the overall CO_2 reductions, "to see how much they have contributed to the pool" (P1). Introducing competition with collaborative elements, could therefore be a potential solution, as peer support from one's reference group has also been noted to play a major role in behaviour change (Ryan & Deci, 2000). The user could be encouraged by the difference between their effort and that of the community, or vice versa. On one hand, in a community aware of lifestyle-related sustainability, a novice on the subject could feel overwhelmed. On the other hand, the novice user could get motivated to attain the same level of contribution as their peers.

5.4. Comments on the concept and its effect on participants' views

As said, the purpose of the presented concept was not to create a gamified version of Sitoumus2050, neither present anything that would be thought of as a complete product.

The sole function of the concept was to help the participants visualize how the gamified version of Sitoumus2050 could *possibly* look, to inspire their thinking. The function of the concept was ultimately a tool for the interviews.

Despite the above, the concept was welcomed very warmly by the interviewees. All of the participants praised the four-level observation of the community's progress, and the quad-way visualization of the progress tracking. The collaborative community was a welcome function, that was thought to inspire more people to join the service, and those already using the service to return to it more often. However, one concern arose regarding the visualization of the communities' progress compared to others: if the use rate of the service is less than optimal, the map would show, e.g. "only this one coloured spot here" (P3), which could lead to a demotivation of users or potential users. This is abundantly a possibility, as the users might lose their motivation, if they felt they were the only ones using the service. On the other hand, were the use rate more than optimal, the possibility of attracting even more users and activating those already using the service, could improve. In this, I believe it is not ultimately a concern of the design, rather than marketing the service in such a way that could attract and increase conspicuousness of the service altogether.

Ultimately, the views of the participants remained unchanged when comparing their opinions on gamifying Sitoumus2050 before and after presenting the concept – the unanimous opinion was that gamifying Sitoumus2050 would rather improve its usage than lessen it. However, the participants did not seem to be concerned about the impact on the seriousness of the service as much as they did before the concept was presented. This could mean that the concept presented met the requirements of seriousness that were brought up. It could be, that gamification is perceived with certain attitude that gamification has close ties to playing, therefore understandably associating the phenomenon too strongly with games. As such, gamification can be seen as reducing the seriousness of the system it is implemented on, while in truth, gamification design can be very subtle. Mostly, the elements that could damage the seriousness or the representation of the owner of the system, are elements of narrative and of story. If stories and visual presentations of the current climate were implemented, the seriousness might suffer.

5.5. The concept: community, progress tracking, competition

Overall, the consensus among participants was that community and progress tracking were functionalities that Sitoumus2050 would greatly benefit from, whereas competition, which was not included in the original concept, would not bring worth to the service – in the worst case it would diminish it.

The reason why community was held in such a high regard was because all the participants felt that it would be a reason to both keep using the service, as well as attract more users. New users could be pressured to use the service for the good of the community (P1, P2). As some participants (P1) stated, the social pressure inflicted unconsciously through communities could affect, even greatly, to the reducing of the users' carbon footprint. As Ryan and Deci (2000) have said, the encouragement from one's reference group has positive impact on helping with one's motivation. The social dimension would greatly improve the chances of, e.g. recycling, when the user would know that the building they lived in already had proceeded 70 % towards the goal of the community. This could result in a need to do one's part. Furthermore, the anonymity of the community was welcomed, as one of the participants (P3) felt that public presentation of one's environmental impact would reduce the enjoyment and therefore use of the service – climate change being a sensitive subject in today's world, pinpointing, e.g. the resident with the highest carbon footprint could result in counter-productive behaviour.

One participant mentioned other related themes, such as the importance of one's image (P1) and the need to influence others, be a part of something greater. In addition, "the observation of social media channels", was also mentioned to indicate "that peer support could have a great impact on reducing our CO_2 emissions" (P3), which means the community surrounding Sitoumus2050 would be great addition, as commented on above. (See Ryan & Deci, 2000.)

Progress tracking was seen as the most important feature for making the users return to the service – to check their progress and achievements could, according to the participants, increase the number of returning users (P1, P2). The possibility to track one's progress combined with reminders of their journey, could lead to a more thriving community. Through a thriving community, the use of the service, and its impact on the carbon footprint of the users, could then be even greater, if we are to assume that peer support and communities can significantly encourage the reduction of the carbon

footprint of its members. In addition, the size of the community might positively correlate to the activity of the members (see Hamari, 2013; Hamari & Koivisto, 2013). The concern that the set goals are too vast was heeded as a problem at this section as well (P1, P4) – to combat this, the goals could potentially be split into smaller pieces, e.g. 1 000 kg CO_2e reduction during a given time, instead of halving one's carbon emissions.

A competition feature was not deemed useful in the present context by any of the participants. According to the participants, the implementation of a competition function could result in either great rewards (P2) or critical losses (P2, P3), as those who motivate themselves through competition might lose interest in the service once they have "won". This way, the extrinsic motivation, competition, would fail to shift into intrinsic motivation. In addition, there is the matter of cheating: "There is a lot of research that says that competition creates this cheating behaviour and it distracts from the main thing at hand" (P4), the reducing of one's carbon footprint, which could be combated through collaboration. A differentiating opinion from the consensus, one participant felt that competition could indeed bring worth to the service, were it conducted in a way that the competitor unit was larger than one person, e.g. cities, municipalities, companies, that inspire their citizens and employees to challenge themselves and other similar clusters (P3). This would then bring competition through collaboration, which was also mentioned above, that could prove fruitful to both the service, its owner and the clusters and their users, and most of all, the environment. In this, the units, or e.g. cities, could challenge their members, residents, to reduce their carbon footprint more than the neighbour cities (P3). This would tighten the community and bring competitional elements, without the possibility of one user's competitiveness to diminish the motivation of other users. The community engaging is also one of the less studied fields of gamification (Koivisto & Hamari, 2019), which could be filled by the research of similar services, as the suggested gamified Sitoumus2050.

5.6. Highlights of gamified Sitoumus2050 and ideas of improvement

The most important elements of the concept were the progress tracking and community. Progress tracking in itself is the foundation of other functionalities, which made it the most important element. The community was held in high regard because of its close connection to the substance: environmental activism and influencing. Communities are also important sources of knowledge peer support and social pressure, which might

potentially lead to a more frequent use of the service and greater reductions of carbon footprint.

Through the interviews, the participants suggested improvements based on their own experience or their view on the gamified concept. Some of the suggestions or similar to these have already been mentioned during the last sections as part of the analysis.

The profiling of communities through the reduction of their CO_2 emissions (P1). Some communities could profile themselves as a community that reduces their emissions through diets, or through consuming less. This probably would not have any effect on the usage of the system or reductions of CO_2 emissions, but it could form stronger connections inside the communities, to distinguish one community from the next.

Designing progress tracking in such a way, that even incomplete tasks contribute to the progress (P2). This would mean that the user would progress on their journey to, e.g. veganism even if they occasionally consume dairy products; or if they mostly use public transport but use personal vehicles for hobbies. This would, however, result in a tremendous amount of updating the service, which might lead to demotivation (P2).

Designing goal achieving in such a way that greater goals are achieved through smaller goals (P1). Designing the goal system this way is a challenge. The smaller goals would increase the progress and contribute to the completion of a larger goal.

Companies challenging their employees to live more sustainably (P2). If companies had a community of their own, they could challenge their employees to various challenges, such as eating only vegetarian meals in the canteen or using a bike when commuting to work. This way, the workers could compete against each other or; the companies could compete against each other.

Municipalities tracking the CO_2 emissions of their inhabitants to improve city planning (P3, P2). If the municipalities were able to see their inhabitants CO_2 emissions and their usual locations, they could make changes to planning to better help their inhabitants to reduce CO_2 emissions, e.g. planning public transport to areas that seem to only use personal cars, and not public transport – this could be a sign that the public transport has a fringe area somewhere in the municipality.

Visual narrative that tells the user their progress (P4). A visual narrative could tell a story that either thrives or withers depending on the actions of the user. The visual

narrative could be a garden that flourishes as the user reduces their CO_2 emissions, or a garden that slowly rots as they don't. This could help the user to acknowledge the result of their actions, as "seeing is believing" (P4).

6 DISCUSSION

The present thesis started with a statement, that imminent actions are to be taken to combat anthropogenic climate change and limit it to desired levels. I observed gamification as a tool to influence people's actions, to teach new, even better habits. Eventually, I ended up with a research problem, whether gamification could inspire pro-environmental actions, whether it could be possible to say that gamification, if used correctly, could make environmentally friendly actions desirable, as opposed to actions that do not benefit, or even harmed the environment.

Based on this research problem, three individual research questions were formed and presented. The research questions were formed on a general level, observing the gamification of a carbon footprint calculator. In this thesis, the calculator studied was Lifestyle test, a carbon footprint calculator created by Sitra, as a part of Sitoumus2050 service. Sitoumus2050 was added, in a conceptual manner, with affordances familiar from gamified services. This concept was used as a part of the expert interviews, to inspire their thinking, to constitute better understanding of how a gamified service would appear to the user. This chapter is dedicated to discussion, whether the research managed to formulate answers to these research questions. It is noteworthy to mention, that the answers to the research questions are based on the opinions of the experts, filtered through the researcher and then derived from this.

RQ1: In what manner, if any, would the gamification of carbon footprint calculators affect users' willingness to use them? The unanimous opinion of the participants was that through the implementation of gameful elements, experiences; gamification, would be possible to attain a better attractiveness, and therefore, use of the Sitoumus2050 service. This was mainly highlighted as a comparison of the current situation as opposed to a situation, where the service was gamified. As of now, Sitoumus2050 is not an overly interactive service, and the interaction produced in the process of gamifying the service would likely get the users to return to the service more often. The current version of the service does not inspire the user to return to the website. Through, e.g. progress tracking, the user would be, upon returning, able to observe their progress to a more sustainable way of living, and see whether they have accumulated any achievements when changing the way they live their lives. Through the possible increase in returning users, it is plausible to say that the willingness of the users to use the system, has indeed, increased.

RQ2: Could the gamification of carbon footprint calculators motivate its users to make more sustainable choices? The answers to RQ2 are more complicated, than RQ1. If, indeed, the answer to the RQ1 is positive, and the willingness, therefore rate of use has increased through gamifying the carbon footprint calculator, it could be possible derive that the rate of use positively correlates to the amount of sustainable actions the users take, as opposed to environmentally harmful or neutral ones. Through, e.g., social dimensions of gamified Sitoumus2050, a community built based on the location and choices of the user, the user would be surrounded by people with similar goals regarding sustainable living. Through this communal setting, the user might be able to make conscious, or unconscious, steps towards a more sustainable way of living. In addition to this, the probability of returning, as discussed above, would probably increase the awareness of their actions, hence resulting in more sustainable choices. However, this question, to be answered properly, would probably need a more focused research, to actually study people's habits, and needs, regarding sustainable choices.

RQ3: Could the increased tracking of one's carbon footprint lead to reduced CO_2 emissions for the user? Based solely on the interviews of the study, the answer is positive. Tracking of one's carbon footprint, and challenging oneself with the use of gamified affordances, would, indeed, result in reducing the user's carbon footprint, i.e. lifestyle-related CO_2 emissions. When the user receives visual feedback on their actions, those actions take on a concrete meaning. Through witnessing the result of their actions, while only in digital form, the users could find meaning through their actions, were it otherwise unattainable to them: as one's CO_2 emissions are unobservable through one's eyes, a visualisation of one's journey towards a more carbon neutral lifestyle could be something to find meaningfulness in. This is different from many other changes in the way of living, as many of those are observable through normal means. If one were to decide on losing weight, they could look at the mirror or observe their state of health, their physical condition. Losing weight can be seen, and the improved health conditions can be felt. However, the amount of carbon emissions caused by a person is unobservable, unless it is visualised in numbers or graphs. This way, we could derive that to more easily introduce one to the concept of reducing their CO_2 emissions, the visualisation of it is critical, especially when the topic is not of utmost concern to them, as then the intrinsic motivation would not be as strong as to commit them to sustainable actions.

As stated above, the phenomenon has been studied from the Sitoumus2050 service's point of view. However, being a service included with a carbon footprint calculator, it is plausible to say that this can be generalised to many other carbon footprint calculators, or CO_2 emissions trackers available. However, as the study was based on the views and opinions of four experts in their relevant fields, the results are not generalisable to any population, as qualitative studies rarely are. For more on the limitations of the study, see section 7 Limitations and future research.

Viewing the study as a whole, the research questions were, mostly, provided with a positive answer. Ultimately, based on the results of the present thesis, we can posit that the gamification of carbon footprint calculators would bring value to the service by encouraging users to more often return to the service, and to the user by making tracking of one's carbon footprint easier, thus encouraging the reduction of it, which could ultimately lead to a positive environmental impact.

7 LIMITATIONS AND FUTURE RESEARCH

The data of the present Master's thesis was gathered via expert focus interviews. The participants were carefully chosen in collaboration with Finnish Innovation Fund Sitra to shed light on the phenomenon from several points of view. The gathered data was viable and it is plausible to say that the data answered the research questions formed in the introduction of the thesis. However, as the research was relatively small-scale, it is possible for the results to have gaps, which more participants with different fields of expertise could have filled. A limitation of the study is thus the number of interviewees. However, as the present thesis is qualitative study, there are no problems related to generalisation of the results, to begin with.

As the participants interviewed consisted of experts in their own fields, it is natural for them to err, being human beings. Although they are experts, it is not probable they would be able to infallibly dictate whether or not, e.g., gamified service would attract more users as opposed to ungamified one. Through a survey on potential users of a gamified Sitoumus2050 service, this gap in information could have been filled.

Furthermore, the methods of the study and the roles of the participants can be found to affect the results. As some of the interviewees were personally tied to the Sitoumus2050 service, it is plausible to say that their personal involvement with the system could have affected their views on the possibility of gamifying the said service.

When observing the interview structure and interview questions, it becomes apparent that the interviewees should have been asked about their views and their definition for environmental sustainability and sustainable actions, in addition to the questions about sustainable development. In the present thesis, where those questions were left unasked, the sustainability and sustainable actions have been observed jointly, complemented by theory on environmental sustainability. While this might seem dubious, I think its effect on concrete results is quite minimal and does not affect the outcome of the present thesis extensively.

As mentioned in the thesis, the created concept was solely used to inspire thinking of the participants, not to present a complete product or a suggestion on how to gamify the Sitoumus2050 service. Still, it is possible that the conceptual design and incompleteness of the presented concept affected the views on gamifying the service. It is also possible, that the sheer involvement of the concept shifted the discussion into a more evaluating

way, which could have been avoided without any concrete example of gamifying the service.

As indicated in Koivisto and Hamari's (2019) study, the gaps in different kinds of gamification research are numerous. Especially studies done on gamification, and its effect on sustainability, are few. To continue the present research, a suggested way would be to conduct a survey on potential users, to shed light on the actual need and usefulness of a gamified Sitoumus2050 service, or any gamified carbon footprint calculator service in general.

An interesting area of research would be a longitudinal study on people's carbon footprints using a gamified carbon footprint calculator, or other sustainability-related gamified service. Through this focus, we could find out whether using such a service actually makes an impact on the behaviour of the users – even outside of using the service.

Also, as the seriousness of the service after gamifying it raised concern, path for future research could be to find out, whether gamification is, indeed, met with such ease and levity, that could diminish the seriousness or integrity of the service it is implemented on. It might as well be, that the attitude towards gamification is heavy with doubt because of its origins in leisure time and fun activity.

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APPENDIX 1. INTERVIEWEE PROFILES

1) Role (in their company)

2) Their relevant field, area of expertise

3) Relationship with gamification, games; sustainability and sustainable development

4) Prior, concrete experience on gamified services

Profile of P1

1) User Interface designer

2) Familiar with the utility of gamification and user interfaces

3) Very knowledgeable about the concept of games – has played games all their life. Conflicting views on gamification, sees benefits and downsides to it. Thinks of sustainability as a phenomenon of the whole society, views don't include an individual as much as the whole nation.

4) Has a lot of experience on gamified software.

Profile of P2

1) Coordinator in their company, owner of Sitoumus2050

2) Sustainability and sustainable development, Sitoumus2050

3) Is familiar with the concept of gamification but does not have a professional relationship with the concept. The idea of gamifying services is often present in their work. Very familiar with sustainability and sustainable development.

4) Has experience on gamified services – does not necessarily know, however, what counts as gamified service, and what is viewed as a game.

Profile of P3

1) Coordinator in their company, has seen the development of Sitoumus2050

2) Sustainability and sustainable development, Sitoumus2050

3) Is familiar with the concept of gamification but does not have a professional relationship with the concept. Very familiar with sustainability and sustainable development.

4) Has experience on gamified services – does not necessarily know, however, what counts as gamified service, and what is viewed as a game.

Profile of P4

1) Gamification researcher

2) Gamification

3) Expert on gamification, and familiar with sustainability and sustainable development – does not have a professional connection to sustainability

4) Extremely familiar with gamified services

APPENDIX 2. INTERVIEW STRUCTURE IN FINNISH

Perustiedot

1. Haastateltavan nimi
2. Haastateltavan rooli yrityksessä
3. Haastateltavan asiantuntemusalue
4. Haastateltavan suhde pelillistämiseen ja kestävään kehitykseen
5. Oletko käyttänyt pelillistettyjä sovelluksia?

Pelit, pelillistäminen ja kestävä kehitys

1. Mitä kestävä kehitys sinusta on?
2. Kuinka tuttu aihe pelit ovat sinulle?
3. Mitä pelillistäminen sinusta on? Voitko nimetä jonkinlaisia tiettyjä pelillistämisen affordansseja?
4. Onko sinusta pelillistämisellä joitain hyötyjä? Entä haittoja?
5. Pelien ja pelillistetyn sovelluksen erot?
6. Miten pelillistämisellä voisi vaikuttaa ihmisen käyttäytymiseen?
7. Voisiko tiettyjä käytöksen piirteitä rohkaista pelillistämisen avulla? Mitä? Miten? Toimiiko pelillistäminen erityisen hyvin jonkin ihmistoiminnan kannustamiseen? Innokkuuteen, frekvenssiin?

Haastattelijan ajatuksia Sitoumus2050-palvelun pelillistämisestä

1. Voisiko tämä palvelu hyötyä pelillistämisestä?
2. Millä tavalla palvelun voisi sinun mielestäsi pelillistää?
3. Millaiset pelillistämisen elementit sinusta voisivat toimia parhaiten kyseisessä palvelussa?

Konseptin esittely

1. Mitä ajatuksia tämä konsepti sinussa herättää?
2. Millaisia hyötyjä tai haittoja tällaisen konseptin käyttöönotossa Sitoumus2050-palvelussa voisi olla?
3. Uskotko, että tällainen pelillistetty versio palvelusta voisi vaikuttaa palvelun käyttämiseen? Miten?
4. Voisiko konseptin kaltainen versio palvelusta lisätä sen käyttöä? Mikä voisi mielestäsi lisätä palvelun käyttöä?

Erilliset ominaisuudet

1. Millä tavalla yhteisöllisyyden lisääminen pelillistämisen keinoin voisi vaikuttaa
    1. Palvelun käyttöön?
    2. Hiilijalanjäljen pienentämiseen?
2. Millä tavalla edistymisen seurannan lisääminen pelillistämisen keinoin voisi vaikuttaa
    1. Palvelun käyttöön?
    2. Hiilijalanjäljen pienentämiseen?
3. Millä tavalla kilpailun lisääminen palveluun voisi vaikuttaa
    1. Palvelun käyttöön?
    2. Hiilijalanjäljen pienentämiseen?

Lopuksi

1. Millaisia ominaisuuksia pelillistetyssä versiossa olisi hyvä esiteltyjen lisäksi olla?
2. Mitkä ominaisuudet ovat mielestäsi tärkeimpiä?
3. Muita kommentteja?

APPENDIX 3. INTERVIEW STRUCTURE IN ENGLISH

Basic information

1. The name of the interviewee
2. Your role in your company?
3. Your area of expertise?
4. The interviewee's relationship with the concept of gamification and sustainable development
5. Have you used gamified software?

Games, gamification, sustainable development

1. What, in your own words, is sustainability or sustainable development?
2. How familiar are you with the concept of games?
3. What, in your own words, is gamification? Can you name any affordances related to gamification?
4. Are there any benefits or downsides to gamification?
5. The differences between games and gamification?
6. Would it be possible to affect one's behaviour through gamification? In what way?
7. Could we enforce certain aspects of one's behaviour through the use of gamification? What aspects, and how?

The interviewee's thoughts on gamification of Sitoumus2050

1. Could this service benefit from gamification?
2. How one could gamify this said service?
3. Which affordances or elements of gamification would work best in the said service?

Concept

1. What do you think of this concept?
2. What kind of benefits and downsides would this concept bring to the service?
3. Do you believe that the implementation of similar concept would affect the usage of the service? How?
4. Could the implementation of this concept increase its usage? If not, what could?

The different elements in this concept

1. How could the implementation of community through gamification affect
    a. The usage of the service?
    b. The carbon footprint of the user?
2. How could the progress system affect
    a. The usage of the service?
    b. The carbon footprint of the user?
3. How could elements of competitiveness affect
    a. The usage of the service?
    b. The carbon footprint of the user?

Finally

1. What kind of elements not mentioned in the concept would bring more worth to the service? What would you add?
2. What elements are the most important, in your opinion?
3. Any other comments?